International Journal of Community Medicine and Public Health
Sapna B et al. Int J Community Med Public Health. 2025 May;12(5):2247-2254
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20251383

Original Research Article

Assessment of dental anxiety among the patients visiting a dental institution: a cross-sectional, questionnaire-based survey

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Received: 20 February 2025
Revised: 06 April 2025
Accepted: 07 April 2025

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ABSTRACT

Background: This study aimed to assess dental anxiety among patients visiting a dental institution in Davangere, India.
Methods: This study included 400 participants aged ≥18 years. Demographic and non-demographic information were obtained through a questionnaire. Dental anxiety levels were determined using a language-translated version (Kannada) of the Modified Dental Anxiety Scale (MDAS-K). Statistical analyses were performed using the Mann–Whitney U test, Kruskal–Wallis ANOVA, and Chi-square tests.
Results: The mean overall dental anxiety score for 227 female and 173 male participants, aged between 18 and 82 years was 16.6±2.6. The Anxiety score was slightly higher among Females, younger and early adults, and highly educated patients with lower incomes. However, this difference was not statistically significant. First-time visitors, those who had unpleasant dental experiences in the past (p=0.001), those who avoided dental treatment because of anxiety (p=0.000), and those who graded their oral health as poor to average (p=0.006), all had slightly higher mean anxiety scores. The degree of dental anxiety did not significantly correlate with any of the demographic or non-demographic factors (p>0.05).
Conclusion: The level of dental anxiety was found to be high (62.8%) and extremely high (22.5%) among the patients who visited a dental institution in Davangere City.

Keywords: Dental anxiety, Modified dental anxiety scale, Self-perceived oral health, Dental treatments

INTRODUCTION

Anxiety is defined as a state of apprehension of an unknown danger resulting from the anticipation of a threatening event or situation. The fear occurs in the presence of an observed or known threat. In contrast, a phobia is a persistent fear unreasonably cued by the presence or anticipation of a specific object or situation.[1,2] Anxiety and fear are common problems frequently experienced by patients while undergoing dental procedures across the globe.[3] Dental anxiety is a state of uneasiness and worry, making the patient feel that something terrible will happen to him regarding dental treatment and procedure.[4] Dental anxiety is ranked fourth among common fears and ninth among intense fears.[5] Various factors causing dental anxiety include unpleasant previous experiences, stories of painful dentistry from siblings and friends, misleading information from media sources, and fear of noise made by drills and dental instruments.

Despite advances in dentistry, anxiety about dental treatment and the fear of pain remain widespread among patients and are significant universal barriers to oral

health care services.[6-8] Patients suffering from dental anxiety are a significant source of stress that can jeopardise the dentist's clinical efficiency and remain a serious concern for the dental practitioner and the patient for the provision of routine dental care on a day-to-day basis.[9] Dental anxiety can also have physiological, cognitive or behavioural impacts on daily living. Hence, identifying anxious patients and their appropriate management by correct treatment strategies becomes crucial in clinical practice.[10,11] So, the present study was planned to assess the level of dental anxiety among patients visiting Bapuji Dental College and Hospital, Davangere.

Research question

What is the level of anxiety among the patients visiting a dental institution.

METHODS

Study design

An Observational, Descriptive, Cross-Sectional, questionnaire-based Survey was planned to conduct the present research.

Study duration

The study was conducted for a period of 6 months, between November 2023 to April 2024.

Source of data

The present study was conducted by including outpatients (≥18 years) visiting various departments of Bapuji Dental College and Hospital, Davangere.

Sample size determination

The sample size was calculated using the formula: N= 4pq/l2, considering the p=51.8% (Prevalence of dental anxiety from a study by Appukuttan, et al in 2015)10, q=0.482 and allowable error=5%. The sample size was derived to be 400.

Sampling technique

The non-probability-consecutive sampling technique was adopted. The patients were employed in the waiting area before their appointment. Patients who met the inclusion criteria and provided informed consent to participate were recruited until the required sample size (n=400) was obtained.

Selection criteria

Patients aged ≥18 years, visiting the various departments, Willing to participate and able to understand, read, and fill out the questionnaires were included. Patients not willing to participate, medically compromised and with physical and mental disabilities, and with a history of psychiatric illness were excluded.

Ethical approval

Institutional Ethical Review Board (Bapuji Dental College and Hospital, Davangere) approval was obtained before the start of the study.

Description of the study proforma

Data for the study was collected using self-structured proforma covering different sections. Sections I and II: Participants' information letter and Informed consent, Section III: Demographic details (age, gender, education, occupation, income and place of residence), Section IV: Non-demographic details (previous dental visit, experience of last dental visit avoidance of dental visit and self-perceived oral health) Section V: Questionnaire to measure dental anxiety (MDAS-K)

Questionnaire to measure dental anxiety

The self-rating modified dental anxiety scale (MDAS) introduced by Humphris et al, translated into the local Kannada language, was used to assess dental anxiety in the present study (MDAS-K).[12] One of the renowned Kannada language researchers translated the English version of the questionnaire. Translation validity was tested by back translation by an expert who knew both languages. A few modifications were done for easy understanding as suggested by the language experts. Then the MDAS-Kannada version was subjected to Face validity and content validity by consulting experts in different departments of a dental institution.

The CVI score for relevance, clarity, simplicity and ambiguity was found to be 0.90, 0.92, 0.92, and 0.90, respectively. Necessary modifications were made based on the comments of the validators. The questionnaire was pilot-tested on 10 dental patients and checked for reliability with Cronbach's alpha test value of 0.86. Then the final version of MDAS-K was administered to dental outpatients to assess their anxiety levels.

Method of data collection

The self-administered questionnaire was given to the patients in the waiting/reception areas of various departments. Care was taken not to influence them in any manner.10-15 minutes were given to the participants to fill in their responses. The filled-in questionnaire was collected back on the same day by checking its completeness.

Statistical analyses

The data obtained was compiled systematically in a Microsoft Excel sheet and subjected to statistical analyses

using Statistical Package for Social Science (SPSS)software version 20. Descriptive statistics was generated to describe the data in terms of Frequencies, percentages, mean, and SD. The normality distribution of the data was checked using the Shapiro–Wilk and Kolmogorov Smirnov tests (Table 1).

Data was found to be non-normally distributed. Hence, as needed, Group differences were analysed using non-parametric tests like Mann–Whitney U or Kruskal–Wallis tests. To compare the MDAS-K scores between categories in the same variable and to check the co-relation between the MDAS-K scores and the demographic variables, the Chi-square test and Spearman's correlation test were performed respectively. A p value of less than 0.05 was considered statistically significant.

RESULTS

The present study consists of 400 patients randomly selected from outpatients of a Dental institution, who answered the Anxiety questionnaire. Of them, 227(56.8%) were females and 173(43.3%) were males (Figure 1).

The participants' ages ranged from 18 to 82 years. Table 2, shows the category of age groups, where the mean age of the participants was 33.46±14.6. Most of the patients were young adults (42.8%) followed by Early adults (20.8%).

Many patients in the study were from urban areas (74%), and very few were from rural areas (26%). According to the BG Prasad scale for 2024, the majority of the patients reported having a socioeconomic status of class I (44.5%) and class II (27.3%).

There were more people with undergraduate degrees (49%) and postgraduate degrees (23%) followed by pre-university (16%) education among the participants. Unemployed (55%) were slightly more than the employed (45%) individuals.

When the five anxiety-provoking stimuli were evaluated on the MDAS-K scale using 5 points, the mean total anxiety score was found to be 16.6±2.6 (Table 3). It was observed that 43.5% of the respondents were not anxious regarding their dental visit, and 40% felt that they would not be anxious while sitting in the waiting room for their appointment. 31.3% and 36% of the participants felt that getting their teeth drilled and getting their teeth scaled and polished would make them slightly anxious, respectively. 27.8% felt that they would be extremely anxious if they had to receive an injection in their mouth (Table 4).

Furthermore, as depicted in Table 5, based on the sum of the total score of all five questions ranging between 5 to 25, more than half of the participants were highly anxious (62.8%), about 22.5% of the participants were extremely anxious, 11.8% were moderately anxious, 0.8% were slightly anxious, only 2.3% were reported of non-anxious to receive the dental care.

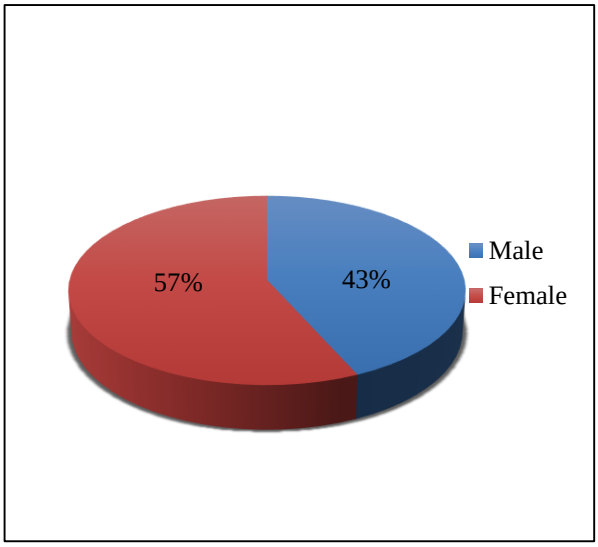

Figure 1: Frequency distribution of gender.

Additionally, when the group differences were analysed using the Mann–Whitney U and Kruskal–Wallis tests (Tables 6), no statistically significant difference was found between the dental anxiety scores of individuals with any of the demographic variables ($p>0.05$). young adults, early adults, and mid-adults had slightly higher total mean anxiety scores (16.7±2.4, 16.7±2.8,16.5±2.8) compared to the older age groups.

Anxiety scores were little higher among females, undergraduate education patients, lower middle (class IV) and Upper middle (class II) income individuals, and in urban residents. A chi-square test compared the anxiety score between categories in the non-demographic variables (Table 7).

There were statistically significant associations found between the anxiety score and the history of previous dental visits, previous dental visit experience, the avoidance of dental care due to dental anxiety and self-perceived oral health ($p<0.05$).

Table 1: Tests of normality.

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Mean Anxiety score	0.124	400	0	0.974	400	0

Table 2: Age range of the study participants.

Subgroups	N	%
Young adults (18-24)	171	42.8
Early adults (25-34)	83	20.8
Mid adults (35-44)	55	13.8
Late adults (45-54)	43	10.8
Pre-retirement (55-64)	28	7
Senior citizens (65 >)	20	5
The mean age of the study participants		33.46±14.57

Table 3: Mean of total anxiety score.

N	Min	Max	Mean	SD
400	5	25	16.62	2.61

Table 4: Frequency distribution of responses to the MDAS-K Questionnaire.

5 points scale	Q1 (treatment tomorrow)		Q2 (sitting in the waiting room)		Q3 (Tooth drilled)		Q4 (scaled and polished)		Q5 (local anaesthesia)	
	N	%	N	%	N	%	N	%	N	%
Extremely anxious	1	0.3	5	1.3	26	6.5	9	2.3	44	11.0
Very anxious	18	4.5	32	8.0	77	19.3	36	9.0	81	20.3
Fairly anxious	51	12.8	58	14.5	87	21.8	70	17.5	79	19.8
Slightly anxious (2marks)	156	39.0	145	36.3	125	31.3	144	36.0	111	27.8
Not anxious (1 mark)	174	43.5	160	40.0	85	21.3	141	35.3	85	21.3
Total	400	100	400	100	400	100	400	100	400	100
Mean±SD	3.3±0.7		3.3±0.9		3.3±1.2		3.3±0.9		3.3±1.3	

Table 5: Categorisation of participants based on total anxiety score.

Interpretation	MDAS score	N	%
Not anxious	< 11	9	2.3
Slightly anxious	11	3	0.8
Moderately anxious	12-14	47	11.8
Highly anxious	15-18	251	62.8
Extremely anxious	≥19	90	22.5

Table 6: Comparison of demographic variables with the anxiety score.

Variables	N	Mean±SD	Mean rank	Comparison of mean anxiety scores	P value
Age (in years)					
Young adults (18-24)	171	16.7±2.4	204.39	H=1.66 (5) Kruskal Wallis ANOVA (df)	0.89
Early adults (25-34)	83	16.7±2.8	203.13		
Mid adults (35-44)	55	16.5±2.8	200.12		
Late adults (45-54)	43	16.2±2.5	180.85		
Pre-retirement (55-64)	28	16.4±2.7	205.7		
Senior citizens (65 >)	20	16.0±3.4	192.35		
Gender					
Male	173	16.3±2.4	188.56	U=17570.500 Mann-Whitney U Value	0.069
Female	227	16.8±2.7	209.6		
Education					
Degree/Diploma	197	16.8±2.3	212.96	H=8.404(4) Kruskal Wallis ANOVA (df)	0.078

Continued.

Variables	N	Mean±SD	Mean rank	Comparison of mean anxiety scores	P value
Post-Graduation	91	16.5±2.5	191.75		
Pre-University	64	16.5±2.9	203.6		
School	26	15.7±2.7	159.81		
Uneducated	22	15.3±3.5	164.2		
Occupation					
Unemployed	80	16.6±2.7	203.16	H=3.42(3) Kruskal Wallis ANOVA (df)	0.33
Employed	181	16.6±1.8	201.65		
Retired	13	15.5±2.5	142.81		
Student	126	16.6±2.6	203.12		
Income					
Class I	178	16.6±2.4	199.61	H=4.58(3) Kruskal Wallis ANOVA (df)	0.205
Class II	109	16.8±2.4	210.5		
Class III	69	16.0±3.4	176.99		
Class IV	44	16.9±2.6	216.2		
Residence					
Rural	104	16.1±2.5	182.69	U=13540.000, Mann-Whitney U Value	0.065
Urban	296	16.8±2.5	206.76		

Table 7: Comparison of non-demographic variables with the anxiety score.

	N	%	Mean±SD	Comparison of mean anxiety scores	P
Previous dental visit					
No	127	31.8	16.8±2.7	X^2=0.014 (1)	0.905
Yes	273	68.3	16.5±2.6		
Dental visit experience					
Unpleasant	69	25.3	16.7±2.6	X^2=12.02 (1)	0.001*
Pleasant	204	74.7	16.0±2.5		
Avoided any treatment due to anxiety					
No	148	37	16.4±3.2	X^2=15.86 (1)	0.000**
Yes	252	63	16.8±2.2		
Perceived oral health					
Average	145	36.2	16.7±2.6	X^2=12.61 (3)	0.006*
Bad	19	4.75	16.7±3.1		
Can't say	9	2.25	16.6±2.5		
Good	227	56.75	14.8±4.6		

*statistically significant (p<0.05). **highly statistically significant (p<0.001).

DISCUSSION

Dental anxiety is an important factor relative to the oral health and well-being of an individual. It is considered to be one of the important barriers to the utilization of dental services and the avoidance of dental care, resulting in poor oral health status.

However, it becomes imperative on the part of the dentist to understand the factors influencing dental anxiety among individuals and to take appropriate measures to manage, control or alleviate dental anxiety to bring out an overall improvement in the oral health status of a person through positive dental healthcare-seeking behaviour.[13]

The purpose of the current study was to evaluate dental anxiety in adult patients (over the age ≥18 years) who were visiting the Bapuji Dental College and Hospital, Davangere. The translated version of the modified dental anxiety scale in Kannada language (MDAS-K) was used to measure the level of dental anxiety. MDAS-K version showed good validity and reliability with a Cronbach's alpha value of 0.86, which is slightly higher than the value reported by Gupta et al for a similar MDAS-K version (0.83) and the Indian version of the MDAS found by Acharya (0.78).[11,14] Further, the information regarding the demographic variables (age, gender, education, occupation, income and place of residence) and non-demographic variables (previous dental visit, experience of last dental visit avoidance of dental visit and self-perceived oral health) were elucidated through the structured custom-made questionnaire.

In the current study, the mean total anxiety score was 16.62±2.6, which is much higher than the studies reported earlier.4,15 The total anxiety score of 15 and above (highly and extremely anxious) was seen in 85% of the

study subjects. This difference in the anxiety scores can be attributed to different study settings, the population selected, the age group chosen, the sample size employed and the cut-off scores used to separate the dentally anxious individuals and those who were not.

The anxiety levels were higher in the younger and early adults and decreased as age advanced. The explanation could be that older adults are less likely to worry about dental anxiety since they are more likely to be exposed to other ailments and illnesses and their associated treatments. An additional explanation could be that their reluctance to disclose their anxiety led to response bias. Previous investigations have yielded comparable results.[3-8,10,14,16,17] However, certain research suggests that individuals in their earlier years may have less dental anxiety compared to those in their middle years.[5,15] This could be due to shifting attitudes among the young ones as they are more open to seeking care and addressing dental issues early, potentially reducing their anxiety.

In our study, females had slightly higher mean dental anxiety scores than males, but it was not statistically significant (p value<0.05). This finding followed the figures given by many other studies.[3,4,6,7,10,15,16-20] A reasonable explanation for such observation could be attributed to the fact that women usually admit their fears/anxiety more readily than men and have a higher sensitivity to pain or a lower pain threshold contributing to increased dental anxiety among females. However, the study by Mankar et al breaks the patriarchy found in the previous studies in which males experienced higher levels of anxiety than females.[20] But then the study done by DN Shrienitha et al, reported that females and males showed the same level of anxiety.[21]

An interesting point elicited in this study was there was an increasing trend of dental anxiety with increasing levels of education. This was in contrast to the study by Sinha et al, Appukuttan et al, Acharya et al, and Malvania et al.[5,10,14,21] Higher education often involves exposure to a wide range of health information. Some of these might be alarming related to potential dental issues and their extensive treatments. Which could have increased anxiety among well-educated individuals. There was no significant difference noticed in the mean of total anxiety scores between the employed and unemployed, whereas the retired employees showed lower anxiety scores. Similar findings were noticed in the study done by Fotedar et al.[22] The lower dental anxiety scores among retired employees are probably a result of a combination of factors like less stress, more time, improved financial stability, and increased familiarity with dental care.

Our study findings demonstrated that those with lower middle-class socioeconomic status experienced higher degrees of anxiety than those with higher socioeconomic status. It could be that people from lower socioeconomic levels are less likely to seek routine dental care and are more unlikely to experience dental procedures, which manifested as high anxiety among them. In the study by DN Shrienitha et al, the upper lower socio-economic status shows high anxiety levels which also indicates the role of education in dental anxiety.[21] Most of the patients who visited a dental institution were residents of urban areas, and they exhibited higher levels of dental anxiety than the rural residents. Similar findings were noted in previous studies.[18,22] Contrasting results were revealed in a study by Malvania et al where patients residing in villages had a significantly higher score than those residing in the city.[19]

The respondents with a history of previous dental visits showed a slightly lower anxiety score than those with no history of previous dental visits. However, the results were not statistically significant. This is in agreement with many study results which reported an increased anxiousness among patients who have had no previous dental experience.[3,6,11] This might be the result of familiar procedures from past visits contrasted with unfamiliar procedures causing fear in first-timers. A study done by Marya et al, Shrienitha et al and Shrestha et al, showed contrasting results, where the mean dental anxiety scores were higher for those who had visited the dentist earlier(p=0.04).[8,21,23] It could be generally expected that previous unpleasant dental experiences must have elevated the scores.[8]

A previous unpleasant dental experience with the dentist or the dental procedure seems to play an important factor in imparting dental anxiety within the patient's mind.[3,8,9,19] This evidence was proved in the present study, that the participants who had unpleasant dental visit experiences had a higher mean total anxiety score than the patients who had pleasant experiences. This is also supported by previous studies.[3,5,14,22] The reason for such a finding can be attributed to the poor technical skills of dentists and most of the dental care was given by dental students in an institutional setting.[14]

As per the reported evidence in other studies, the present study also showed a highly significant association (p<0.005) between dental anxiety and avoidance of dental treatment due to anxiety.[3,10,11,14,20,22,24] This may result in underutilization or delay in seeking necessary treatment which is detrimental to oral health. Therefore, it needs to be addressed by dental practitioners with a comprehensive knowledge of various pharmacological and non-pharmacological approaches to manage dental anxiety.[20] The study showed that subjects who rated their oral health as poor or average had higher levels of dental anxiety than those subjects who rated their oral health as good (p<0.05). This was following the findings of the study by Appukuttan et al and Gupta et al.[11,24]

Strengths of the study

The study assessed dental anxiety by the use of the modified dental anxiety scale (MDAS) by translating it into the local language (Kannada) for easy understanding

and interpretation by the respondents. MDAS is considered to be highly valid, reliable, and more comprehensive, with a simpler and more consistent answering system.[2,25]

Limitations

Since the study included only the patients who visited a dental institution and used a smaller sample size through the use of a convenient sampling technique and dental anxiety was assessed cross-sectionally, it may not have been possible to determine the precise level of dental anxiety. Thus, the findings cannot be generalized to a larger population except for the research participants. There is a possibility of recall and social desirability bias in the results because of the self-reported questionnaire where the patients might over or underestimated their responses.

Future recommendations

Further research is required to explore more about dental care habits which are non-invasive/ minimally invasive, atraumatic/ least traumatic approaches for prevention, control and management of dental diseases so that dental treatment becomes non-threatening for the common man.

Clinical implications

Treating dental anxiety patients can be challenging. Unpleasant prior dental experiences, avoidance of dental treatments and having a poor perception of one's oral health have been linked to dental anxiety in the current study. To treat dentally anxious patients, it may be advised to assess the patient's anxiety levels and adopt the treatment procedures that will reduce their anxiety and improve their quality of life-related to oral health. Assessing the patient's anxiety levels and implementing treatment plans that would lower the patient's anxiety and enhance their oral health-related quality of life may be recommended for treating dentally anxious individuals.

CONCLUSION

The mean dental anxiety score of the study population was 16.62±2.6. The level of dental anxiety was high (62.8%) and extremely high (22.5%) among the patients visiting a dental institution in Davangere City. None of the demographical variables influenced dental anxiety in the study population. Among the non-demographic variables, unpleasant experience with the dentist/dental procedures influenced their dental anxiety. Many avoided dental treatments due to dental anxiety in the present study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sapna B, Tumminkatti ANA, Kousar A, Tumminkatte AT, Bhavana D, Sulthana DSG, et al. Assessment of dental anxiety among the patients visiting a dental institution: a cross-sectional, questionnaire-based survey
Int J Community Med Public Health 2025;12:2247-54.